

**REMARKS**

The Applicants thank the Examiner for the examination to date and respectfully request reconsideration of the present application in view of the foregoing amendments and the reasons that follow.

Claims 1-36 are currently pending to be examined on their merits. New claims 26 to 36 are method claims wherein the limitations therein are supported claims 1-6 and 18-22.

**I. Claim Rejections – 35 U.S.C. § 102**

Claims 1-7 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Japanese Patent Application Publication No. 2000-288135 (“Kakiuchi”). The Applicants respectfully disagree and traverse the rejection.

Kakiuchi’s teachings cannot anticipate present independent claims 1 and 7 because Kakiuchi does not teach every element recited in present claims 1 and 7. Contrary to the Office’s assertions on page 2 of the Office Action, Kakiuchi does not disclose at least an alloy (1) having improved durability and fatigue resistance over a similar article without said mechanically treated exterior surface and (2) having a plurality of deformations in the exterior surface.

Contrary to the Office’s assertions on page 2 of the Office Action, nowhere does Kakiuchi disclose an alloy having **improved durability and fatigue resistance over a similar article without said mechanically treated exterior surface**. Kakiuchi does not mention durability or fatigue resistance, much less disclose having an alloy having an **improved** durability or **improved** fatigue resistance compared to an untreated alloy, as recited in present independent claims 1 and 7. In fact, Kakiuchi provides no showing of how the mechanical properties of Kakiuchi’s material are improved, or even can be improved. Thus, Kakiuchi’s teachings differ from the present claims at least in this aspect.

Additionally, contrary to the Office’s assertions on page 2 of the Office Action, nowhere does Kakiuchi disclose “deformations” in Kakiuchi’s abstract, at least in the translation version

downloaded directly from the Japanese Patent Office. In fact, the Abstract does not contain the word “deformation.” Such a distinction further points to the fact that Kakiuchi’s teachings are different from the present invention and thus do not provide the improvement in properties that the present invention has.

Furthermore, the Applicants respectfully disagree with the Office’s presumption that Kakiuchi’s alloy is a bulk amorphous alloy because “amorphous alloys comprise bulk-solidifying amorphous alloys” *Id.* Applicants respectfully submit that the Office not established any evidence demonstrating that the alloy of Kakiuchi is a bulk amorphous alloy.

One of ordinary skill in the metallurgical art can appreciate that a bulk amorphous alloy is a specific type of amorphous alloy – the contrast between a traditional amorphous alloy and a *bulk* amorphous alloy is explicitly explained in paragraph [0015] of U.S. Pub. No. 2007/0226979, the USPTO publication of the present Specification, as follows:

Bulk solidifying amorphous alloys are recently discovered family of amorphous alloys, which can be cooled at cooling rates of about 1,000 K/sec or less, substantially lower than traditional amorphous alloys, and retain their amorphous atomic structure. As such, these bulk solidifying amorphous alloys can be produced in thicknesses of about 0.5 mm or more, substantially thicker than conventional amorphous alloys which have maximum thicknesses of about 0.020 mm, and which require cooling rates of  $10^5$  K/sec or more.

For example, one of ordinary skill in the art can appreciate that a bulk amorphous alloy can have a smallest dimension of about 0.5 mm or more and can be made at a cooling rate of 1,000 K/sec or less. By contrast, a conventional amorphous alloy (as in the case of Kakiuchi) is much thinner (*e.g.*, 0.02 mm as shown in paragraph [0015] of U.S. Pub. No. 2007/0226979, and is generally made at a  $10^5$  K/sec or more. The English translation of Kakiuchi discloses in the Abstract that the alloy is made “at the critical cooling speed or higher” ***but fails to disclose the critical cooling rate***, particularly that the critical cooling rate was 1,000 K/sec or less as is normally required to form a bulk amorphous alloy. The mere possibility, as the Office seems to allude to on page 2 of the Office Action, that an amorphous alloy of Kakiuchi *might* be a bulk

amorphous alloy is not sufficient to establish grounds for anticipation based on the doctrine of inherent anticipation.

"To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted). In the present case, Applicants respectfully submit that the Patent Office has failed to provide any extrinsic evidence to allege inherency. It is well established that [i]n relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). However, the Patent Office has failed to provide a basis in fact and/or technical reasoning to reasonably support the determination of inherency.

Because Kakiuchi does not teach each and every element recited in present independent claims 1 and 7, Kakiuchi 's teachings cannot anticipate present claims 1 and 7, and their respective corresponding dependent claims.

Thus, at least in view of the foregoing, the Applicants respectfully request that the rejections be withdrawn.

## II. Claim Rejections – 35 U.S.C. § 103

Claims 8-10 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kakiuchi<sup>1</sup> in view of U.S. Patent Application Publication No. 2002/0193177 ("Poynor"). Claims 11-17 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kakiuchi in

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<sup>1</sup> The Applicants believe that the reference to Sano on page 3 of the Office Action is a typographical error and instead should be Kakiuchi. If the Office disagrees, the Applicants respectfully request that the Office states the basis of the disagreement.

view of Poynor. Claims 19-25 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kakiuchi in view of U.S. Patent No. 6,325,868 ("Kim"). Claims 1-10 are, *in the alternative*, rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kakiuchi in view of International Application No. WO 97/20601 ("Scruggs"). Claims 11-17 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kakiuchi/Scruggs, and further in view of Poynor. Claims 18-25 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kakiuchi/Scruggs, and further in view of Kim. The Applicants respectfully disagree and traverse all of these rejections.

As a preliminary matter, the Applicants note that the U.S. Supreme Court in *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007) has not removed the requirement that the prior art reference (or references when combined) must teach or suggest all the claim limitations. Indeed, *KSR* emphasized cases where all features are known. Furthermore, the exemplary rationales listed in MPEP § 2143 suggest that all elements (when the references are combined) need to be known in the art to support a conclusion of obviousness. Thus, the Office is not relieved of its responsibility of finding prior art teaching or suggesting all the features of the claimed invention to establish a *prima facie* case of obviousness.

The Applicants have set forth the distinctions between Kakiuchi's teachings and the present invention as recited in present independent claims 1, 7, and 8. The Applicants further respectfully submit that Kakiuchi's teachings are different from the present invention. In fact, the Office appears to repeat the error as in the previous Office Action and thus mis-analogize the teachings of Kakiuchi and the present invention. Kakiuchi's teachings rely on forming (1) a residual stress relaxation layer *in residual stress* and (2) machining hardened layer. As already explained in the Applicants' Reply filed April 19, 2011, there is no residual stress formed in the presently claimed amorphous alloys and the presently claimed amorphous alloys do not have dislocations that allow them to be "machined hardened."

The teachings of Poynor, Kim and Scruggs, alone or in combination, do not remedy the deficiencies of Kakiuchi's teachings. Thus, one of ordinary skill in the art would not have had a reason to combine the teachings of Sano with those of Poynor, Kim, and Scruggs. Even

assuming, *arguendo*, that these teachings were combined, the presently claimed invention would not have resulted.

### **Unexpected Results**

Applicant respectfully submit that the claimed exterior surface treated article exhibits ***unexpected results*** that the claimed exterior surface treated article has “improved durability and fatigue resistance over a similar article without said mechanically treated exterior surface” as recited in claim 1. For example, see Examples 1, 2 and 5, which read (with emphasis added) as follows:

#### **EXAMPLE 1**

[0022] Three samples of an untreated golf club face insert made of a bulk-solidifying amorphous alloy (VIT-001 trade designation Zr (41.2) Ti(13.8) Cu (12.5) Ni(10) Be (22.5) atomic percent) were loaded to a failure with loading applied on the front hitting surface. **The [UNTREATED] samples failed with peak loads varying from 2,300 lbs to 2,700 lbs.** The back side of similar samples from the same lot were subjected to a shot-peening process with nominal Almen Intensity (a standard measuring procedure to calibrate the intensity of shot-peening process) of 0.0085 A and shot size of S230R (0.023" shot diameter). **The [TREATED] samples were then subjected to the same loading conditions and failed with peak loads of over 3,300 lbs.**

#### **EXAMPLE 2**

[0023] The untreated golf club face insert samples of Example 1 were subjected to a fatigue cycling loading (similar to in example 1) with a peak load of 2,100 lbs and a minimum load of 1/10 of peak load. **The [UNTREATED] samples failed after several hundreds cycles (between approximately 200 cycles to 900 cycles).** The back side of similar samples from the same lot were subjected to a shot-peening process with nominal Almen intensity of 0.0085 A and shot size of S230R (0.023" shot diameter). **The [TREATED] samples were then subjected to the same fatigue cycling loading conditions, and survived more than 3,000 cycles.**

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#### **EXAMPLE 5**

[0026] Three samples of untreated golf club face inserts made of a bulk-solidifying amorphous alloy in-situ composite with dendritic beta phase (LM-2

trade designation Zr (56.2) Ti(11.2) Nb (7.5) Cu (6.9) Ni(5.5) Be (12.5) atomic percent) were subjected to a fatigue cycling with a peak load of 2,400 lbs applied on the front hitting surface. **The [UNTREATED] samples failed after several hundreds cycles (between approximately 200 cycles to 500 cycles).** The back side of similar samples from the same lot were subjected to a shot-peening process with nominal Almen intensity of 0.006 A and shot size of S230R (0.023" shot diameter). **The [TREATED] samples were then subjected to the same fatigue cycling and loading conditions, and survived more than 1,500 cycles.** Another set of similar samples were subjected to a shot-peening process with nominal Almen intensity of 0.006 A and shot size of S330R (0.033" shot diameter). **The [TREATED] samples were then subjected to the same fatigue cycling and loading conditions, and survived more than 3,000 cycles.**

In short, the specification of the present application provides more than enough evidence to demonstrate that the claimed ***exterior surface treated article*** has "improved durability and fatigue resistance over a similar article without said mechanically treated exterior surface" as recited in claim 1.

Therefore, at least in view of the foregoing, the Applicants respectfully request that the rejections be withdrawn.

**CONCLUSION**

The Applicants believe that the present application is now in condition for allowance and thus respectfully request favorable reconsideration of the application.

The Office is invited to contact the undersigned by telephone if a telephone interview would advance the prosecution of the present application.

The Office is hereby authorized to charge any additional fees which may be required regarding this application, or credit any overpayment, to Deposit Account No. 033975 (Ref. No. 069648-0388438).

Date: August 2, 2011

Respectfully submitted,

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